

The Iguanian Lizard *Liolaemus barbarae* Pincheira-Donoso and Núñez Is a Junior Synonym of *Liolaemus puna* Lobo and Espinoza

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ABSTRACT.—*Liolaemus barbarae* was recently described from northern Chile. However, the character states used to distinguish this species from *Liolaemus puna* are not exclusive. We reassessed the character states used for the diagnosis of *L. barbarae* and compared these with data from the type series and additional specimens of *L. puna*. We found identical ranges or broad overlap in character states between the two species. We conclude that *L. barbarae* is a junior synonym of *L. puna*.

RESUMEN.—*Liolaemus barbarae* fue recientemente descrita como nueva especie para el norte de Chile. Sin embargo los estados de carácter utilizados para diferenciarla de *Liolaemus puna* no son exclusivos. En este trabajo revisamos los estados de carácter utilizados en la diagnosis de *L. barbarae* y los comparamos con datos de la serie tipo y de especímenes adicionales de *L. puna*. Encontramos rangos idénticos o un amplio solapamiento entre estados de carácter de estas dos especies. Concluimos que *L. barbarae* es un sinónimo junior de *L. puna*.

Liolaemus is a widespread genus of iguanian lizards with over 200 species (Quinteros et al., 2008) occupying much of austral South America, from central Perú southward to Tierra de Fuego and eastward to the Atlantic coast of Argentina, and Uruguay then westward to the coast of Chile and southeastern Brazil. Morphological and molecular studies by Laurent (1983, 1985), Etheridge (1995), Schulte et al. (2000), and Espinoza et al. (2004) recognize two major clades: the Chileno group (subgenus *Liolaemus*) and the Argentino group (subgenus *Eulaemus*). A subset of species belonging to the Chileno group has been identified as the *alticolor* group (Lobo and Espinoza, 1999, 2004). The *alticolor* group, as first defined by Ortiz (1981), included only three species: *Liolaemus alticolor* Barbour, 1909, *Liolaemus walkeri* Shreve, 1938, and *Liolaemus tacnae* Shreve, 1941. Subsequently, several new species that previously had been confused with *L. alticolor* or *L. walkeri* have been described and assigned to this group (Lobo and Espinoza, 1999, 2004; Martínez Oliver and Lobo, 2002; Lobo et al., 2007). One of these new species, *Liolaemus barbarae* Pincheira-Donoso and Núñez, 2005, is the subject of our investigation.

The recent recognition that “*L. alticolor*” from northwestern Argentina and adjacent Chile and Perú constitutes not one, but a complex of related species has led to the description of six new species (not including *L. barbarae*) from that region (Lobo and Espinoza, 1999, 2004; Martínez Oliver and Lobo, 2002; Lobo et al., 2007). Lobo and Espinoza (2004) described *Liolaemus puna* from a holotype and 14 paratypes from the Quebrada Los Berros, about 5 km east of Olacapató, Departamento Los Andes, Salta Province, in northwestern Argentina. Additional specimens referred to this species were from the Puna region of Salta and Jujuy provinces and northwestern Catamarca Province in northwestern Argentina, and from

northeastern Chile, from San Pedro de Atacama and the Volcán Tatio region to Chiapa Tarapacá at elevations from 3,680–4,400 m (Lobo and Espinoza, 2004).

Recently, Pincheira-Donoso and Núñez (2005) published a revision of the Chilean species of *Liolaemus*. Although Lobo and Espinoza (2004) was cited in their volume, *L. puna* was not included in their list of *Liolaemus* known from Chile (Pincheira-Donoso and Núñez, 2005:37–39). However, in this same volume they described a new species, *L. barbarae*, for which they designated “Camino Azufrera, al Volcan Licabur, este de San Pedro de Atacama” as the type locality. Although the authors designated a holotype (MNHN 1609), they did not provide the customary description of this specimen. Instead, they noted character variation under the heading “Descripción” (p. 203). Although their diagnosis of *L. barbarae* includes comparisons with *L. puna* (as discussed below), the authors apparently overlooked the fact that two of the paratypes of *L. barbarae* (MNHN 583, 585) were also specimens examined by Lobo and Espinoza (2004) in their description of *L. puna* and were assigned to this latter species. Here, we provide evidence that *L. barbarae* is a junior synonym of *L. puna*.

MATERIALS AND METHODS

For this study, we examined 115 specimens of *L. puna* from Argentina and Chile, including the type series of *L. puna* and the two paratypes of *L. barbarae* mentioned above (Appendix 1). We reassessed the character states used by Pincheira-Donoso and Núñez (2005) in their diagnosis of *L. barbarae*, focusing in particular on how they distinguished that species from *L. puna*. We also compared data from the description of *L. barbarae* (Pincheira-Donoso and Núñez, 2005) with the two paratypes of *L. barbarae* previously examined by Lobo and Espinoza (2004), additional specimens from Chile that were collected near the type locality of *L. barbarae*, data from the type

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TABLE 1. Comparisons of character states used in the diagnosis of *Liolaemus barbarae* by Pincheira-Donoso and Núñez (2005) to distinguish their species from *Liolaemus puna*. Note the identical values or broad overlap in the ranges. Data from MNHN 583 and 585 (paratypes of *L. barbarae*) are from this study.

Character	<i>Liolaemus barbarae</i> Pincheira-Donoso and Núñez (2005)	<i>Liolaemus barbarae</i> Paratypes (MNHN 583, 585)	<i>Liolaemus puna</i> Lobo and Espinoza (2004)	Specimens from Chile (N = 13) (Appendix 1)	Specimens from Argentina (N = 100) (Appendix 1)
Scales around midbody	49–58	45–50	43–54	45–54	38–54
Number of lamellae on fourth toe	21–23	23	19–25	20–24	20–26
Surface of temporal scales	Keel	Smooth to slightly keeled	Smooth to slightly keeled	Smooth to slightly keeled	Smooth to slightly keeled
Males with paravertebral spots	Present	Absent/Present	Absent/Present	Absent/Present	Absent/Present
Males with vertebral line	Present	Absent/Incomplete	Absent/Incomplete	Absent/Incomplete/Present	Absent/Incomplete/Present

description of *L. puna* (Lobo and Espinoza, 2004), and from additional specimens from Argentina (including the type series of *L. puna*). Our results are summarized in Table 1.

RESULTS AND DISCUSSION

The comparisons with *L. puna* in Pincheira-Donoso and Núñez's (2005) diagnosis of *L. barbarae* were apparently based on the type description of *L. puna* (Lobo and Espinoza, 2004) because, under the heading "Material estudiado" (pp. 446–460), no specimens of *L. puna* are listed. However, the data that Pincheira-Donoso and Núñez (2005:205) present for *L. puna* in their diagnosis of *L. barbarae* are at variance with Lobo and Espinoza's (2004:appendix 1, 866–867) description of the former species (as described below); hence the source of this information is unknown.

First, males of *L. puna* are said to lack paravertebral spots and a vertebral line, which are present in males of *L. barbarae*. However, the vertebral line is incomplete or absent in the two paratypes (both males) of *L. barbarae* examined by Lobo and Espinoza (2004). Moreover, in the description of *L. puna*, Lobo and Espinoza (2004) note that "most" (70.6%) males lack a dorsal pattern. Therefore, this character is variable in both species.

Second, the number of scales around the midbody is said to be 40–50 in *L. puna* and 50–60 in *L. barbarae*. However, Lobo and Espinoza (2004) give 43–54 as the number of scales around midbody in *L. puna*, indicating moderate overlap in this character.

Third, the number of lamellae in the fourth toe is said to be 17–18 in *L. puna* and 21–23 in *L. barbarae*. But in the description of *L. puna* the number of lamellae is stated as 19–25.

Fourth, temporal scales are said to be smooth in *L. puna* and keeled in *L. barbarae*. However, in the original description of *L. puna*, temporal scales are said to be smooth or slightly keeled. The difference between smooth and slightly keeled may be subjective.

Additional character descriptions cited in the type description of *L. barbarae* (Pincheira-Donoso and Núñez, 2005), but not used in their diagnosis, had similarly overlapping ranges with the data presented in the type description of *L. puna* (Lobo and Espinoza, 2004). The maximum snout–vent length (SVL) of *L. barbarae* is 57 mm, whereas the SVL of *L. puna* ranged 31.0–55.6 mm. The upper cillaries in *L. barbarae* are 11–14 versus 11–15 in *L. puna*. The number of lower cillaries in *L. barbarae* is 10–13 and also 10–13 in *L. puna*. The number of supralabials in *L. barbarae* is 5–6, likewise in *L. puna*: 5–6. Precloacal pores in males of *L. barbarae* range 3–5, as well as in males of *L. puna*: 3–5. Finally, Pincheira-Donoso and Núñez (2005) state that *L. barbarae* is viviparous, as is *L. puna* (Espinoza and Lobo, 2004).

Given the identical or broadly overlapping ranges of character states between *L. barbarae* and *L. puna*, the geographic proximity of their type localities, and the fact that two of the paratypes of *L. barbarae* were assigned to *L. puna* in the type description of *L. puna*, we conclude that *L. barbarae* is a junior synonym of *L. puna* (ICZN, 1999, Article 23).

Finally, in their discussion of the biogeography of *L. barbarae*, Pincheira-Donoso and Núñez (2005:206–207) referred to the presence of *L. walkeri* in San Pedro de Atacama, where Donoso-Barros (1966) had reported

this species to occur. Lobo and Espinoza (2004) examined 11 specimens from Chile that had been previously assigned to either *L. alticolor* or *L. walkeri*: San Pedro de Atacama (MNH 583, 585, 588), Tarapacá, Chiapa (MCZ 149852, 149854–14956; SDSU 1697–1699), Antofagasta, Volcán Tatío (MZUC 19392), as well as the type series of *L. walkeri*, and the types of other *alticolor* group species from Perú. They concluded that all of the specimens they examined from northern Chile were referable to *L. puna* and restricted the distribution of *L. walkeri* to Perú (see also their fig. 3). Apparently, Pincheira-Donoso and Núñez (2005) did not examine the specimen from Volcán Tatío (MZUC 1939) that had been examined by Lobo and Espinoza (2004), nor the type series of *L. walkeri*, because these specimens are not listed in their volume. Accordingly, all *L. barbarae* and *L. walkeri* populations listed in Pincheira-Donoso and Núñez (2005) are referable to *L. puna*.

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APPENDIX 1

Specimens Examined

Institutional abbreviations follow Leviton et al. (1985) with the addition of Museo de Zoología de la Universidad de Concepción, Chile (MZUC), and Museo de Ciencias Naturales de la Universidad Nacional de Salta (MCN). Some specimen numbers represent lots of more than one specimen. In those cases, the number of specimens examined in the lot is indicated with a number in brackets.

Liolaemus puna: ARGENTINA: Jujuy Province: FML 929, road to Laguna Blanca, Departamento Humahuaca. FML 1265, Susques, Departamento Susques. FML 1512, Road to Rinconada (3,800 m), Laguna Larga, Departamento Rinconada. FML 1517 [3], Cuesta de Fundiciones, road to Mina Pirquitas, between 35 and 37 km before village. Side of mountain west-southeast-northeast, Departamento

Rinconada. FML 1519 [2], 5 km from Rinconada, Departamento Rinconada (3,800 m). FML 1533 [8], Pampa de los Pozuelos to Abra Pampa (40 km from Abra Pampa), Departamento Rinconada. FML 1874, Abdón Castro Tolay, Departamento Cochínoca (3,680 m). MCN 229–232, Abdón Castro Tolay (Barrancas), Departamento Cochínoca, (23°11'48.2"S; 66°3'14.4"W; 3636 m). MCN 698–99, Casa Mocha, climbing from northwest of Nevado del Chañi, Departamento Tumbaya (4,500–4,700 m). MCN 1,718–1,719, 2.5 km southeast of Susques, over Road 16 to Salinas Grandes, Departamento Susques.

Salta Province: FML 1364 (holotype), FML 9914–9927 (paratypes), Quebrada Los Berros, approximately 5 km east of Olacapato, Departamento Los Andes (24°08'21"S, 66°42'3"W; 4,200 m). FML 1661 [5], 1663 [9], Cuesta del Acay, Departamento La Poma (4,100 m). FML 1761 [25], Santa Rosa de los Pastos Grandes, Departamento Los Andes (3,800 m). FML 2779 [2], Quebrada Los Berros, Olacapato, Departamento Los Andes. FML 3647, Campo Amarillo, at

northern base of Cerro Verde, Departamento Los Andes. FML 3348 [2], Ruta Provençe 74, road to Sey, Departamento La Poma. FML 3649, west of base of Cerro Verde, Departamento Los Andes (4,440 m). SDSU 3579–3582, 5.2 km East of Olacapato on Ruta Nacional 51, Departamento Los Andes (24°08'21.3"S, 66°42'3.71"W; 4230 m). MCN 949–950, Road to Abra del Acay from National road 51, Departamento Los Andes (4,700 m). MCN 1890–1892; 1894–1897, km 210, National Road 51, 0.6 km from National Road 51 to rocky hill, to 6.4 km south from road to Olacapato, Departamento Los Andes 24°14'27.6"S; 66°40'37.6"W; 4,070 m). MCN 2177–2179, 10 km west of Escuela Las Arcas, Cachi Adentro, road to Cerro de La Virgen, Departamento Cachi (25°02'40.2"S; 66°16'42.0"W; 3,471 m).

CHILE: I Región, Tarapacá: SDSU 1697–1699; MCZ 149852; 149854–149856; 149858, Chiapa; USNM 165641; MZUC 19392 [3], Volcán Tatío.

II Región, San Pedro de Atacama: MNHN 583, 585 (paratypes of *L. barbarae*), 588.